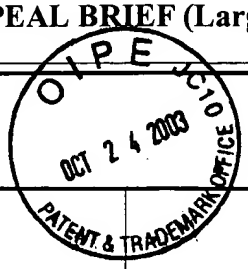
AF/2700
6065-73063

TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No. 6065-73063



In Re Application Of: **Anthony Dezonno**

Serial No.	Filing Date	Examiner	Group Art Unit
09/172,362	10/14/1998	Agdeppa, H.	2642

Invention: **NEURAL NETWORK FOR CONTROLLING CALLS IN A TELEPHONE SWITCH**

TO THE COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on

The fee for filing this Appeal Brief is: **$330.00**

- ☐ A check in the amount of the fee is enclosed.
- ☐ The Director has already been authorized to charge fees in this application to a Deposit Account.
- ☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **03-2470**

Signature

Dated: **October 21, 2003**

Jon P. Christensen
Reg. No. 34,137

I certify that this document and fee is being deposited on **10/21/2003** with the U.S. Postal Service as first class mail under 37 C.F.R. 1.8 and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

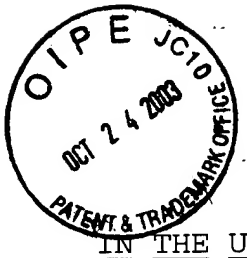
Signature of Person Mailing Correspondence

Abby Boone

Typed or Printed Name of Person Mailing Correspondence

cc:

P30LARGE/REV03



73063 PATENT

#18
SMG
11/4/03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Dezonno, Anthony J. Art Unit: 2642

Serial No.: 09/172,362

Filed: October 14, 1998

For: NEURAL NETWORK FOR CONTROLLING CALLS IN A TELEPHONE SWITCH

Examiner: Agdeppa, H.

Attorney Docket No.: 73063

APPELLANT'S BRIEF UNDER 37 CRF §1.192

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Final rejection of June 30, 2003 and and in support of the applicant's Notice of Appeal filed September 5, 2003, the applicant appeals as follows:

I. Real Party in Interest.

The real party in interest is Rockwell Semiconductor Systems, Inc., by assignment dated October 13, 1998 and recorded at Reel/Frame 9533/0467.

II. Related Appeals and Interference.

None.

III. Status of Claims.

Claims 1, 2, 4-11, 13-20 and 22-24 stand rejected under 35 U.S.C. §103(a) as being obvious over U.S. Pat. No. 5,546,456 to Vilsoet et al. in view of U.S. Pat. No. 5,155,763 to Bigus et al. and U.S. Pat. No. 5,864,617 to Donnelly. Claims 3, 12 and 21 stand rejected under 35 U.S.C. §103(a) as being obvious over Vilsoet et al. in view of Bigus et al., Donnelly and U.S. Pat. No. 5,978,465 to Corduroy et al.

IV. Status of Amendments.

The claims have not been amended since the final Office Action of June 30, 2003.

V. Summary of Invention.

The invention is drawn to a method and apparatus of processing telephone calls in an automatic call distributor (ACD). ACDs are typically used by large organizations to distribute calls with clients among the agents of the organization.

The ACD may include a call distributor (CD) 20 and associated host 16. The CD 20 may include a switch 20 that forms the circuit connections between the clients 14 and agents 28 under

control of the host 16.

Agents of the organization are often assigned to agent groups based upon their skill in handling certain types of calls. However, because of the dynamic nature of client preferences and call loading, some agent groups receive too many calls and some agent groups receive too few calls.

To control the mismatch, one or more neural networks (NNs) 32 is "Included within the host 16 . . . which control system resources (e.g., the number of agents in a particular agent group, the number of incoming calls per time period accepted by the system 10, the number of outgoing calls initiated by the system 10, the number of calls in the queue of each group, etc.) (specification, page 9, lines 18-24). "Each NN 32 may be created and organized in a manner known in the art (e.g., see 'AS/400 Neural Network Utility: User's Guide and Reference PRPQ P84189')" (specification, page 9, lines 24-27).

In order to adapt the NN 32 for its role as a resource controller of the ACD, an Application Programming Interface (API) may be provided "to enable the supervisor to select a neural network model such as the back propagation model" (specification, page 13, lines 24-26). The supervisor "may be prompted to identify a database within the host 16, which may be used to train each NN 32" (specification, page 13, lines 30-32). In addition, "Other screens may be provided through which the supervisor may input information and adjust weights given to the input information" (specification,

page 13, line 32 to page 14, line 2).

After training, the supervisor "may periodically monitor and adjust weighting values of the NN 32 as appropriate to system performance" (specification, page 14, lines 4-7). In operation, the NN 32 "improves its performance on a particular task by trial and error" (Newton's Telecom Dictionary, definition of "Neural Network" provided with Response of 1/19/01).

Once adapted to the operation of the ACD, "the NN 32 may receive input information on system operation from any number of sources (e.g., from the CD 20, supervisors station 34, etc.). Information received from the CD 20 may include: the number of agents signed onto the system 10, the number of agents available for accepting calls, the delay time which a call experiences before delivery to an agent, an average time a call experiences before answering, an average talk time, a time of day, day of week, etc." (specification, page 10, lines 3-12). Further, "Based on that information, the NN 32 may assign agents to groups or transfer agents among groups, based upon group loading. The NN 32 may also initiate and control outgoing call campaigns in conjunction with the control of the agent groups. Further, the NN 32 may also control the rate at which the CD 20 accepts calls from the PSTN 14." (specification, page 10, lines 13-19).

VI. Issues.

Whether an Examiner may ignore the claim language and

reject the claims based upon what he perceives the invention to be.

VII. Grouping of Claims.

It is believed that the rejection of claims 1-24 is based upon the same common error. It is therefore requested that the claims be grouped together for the limited purpose of this appeal.

VIII. Argument.

A. Claim 1, upon which claims 2-9 depend, is drawn to "training a neural network with a set of desired resource relationships for servicing a plurality of call processing load conditions in the automatic call distributor; and distributing resources of the automatic call distributor based upon call processor loading and the training of the neural network". Claim 10, upon which claims 11-18 depend, and claim 19, upon which claims 20-24 depend, contain structural limitations drawn to similar subject matter.

As should be clear from the description of the invention and Responses (see Response of 4/9/03, page 4), the resources distributed by the automatic call distributor are the agents of the automatic call distributor. As such, control of call acceptance and of outdialed calls are relavant only to the extent that they effect the distribution and workload of the agents of the automatic call distributor. For example, the claims are limited to the distribution of resources based upon call processor loading. Since

call acceptance and outdialed calls are directly related to call processor loading, the distributed resources would not be accepted calls or outdialed calls alone because this would cause the anomalous situation where the distribution of resources is based upon itself. Since the distributed resources are resources that are directly related to the automatic call distributor, it is believed that Vilsoet et al., Bigus et al., Donnelly and Corduroy et al., taken together or individually, fail to teach or suggest the claimed invention.

For example, Vilsoet et al. is directed to a predictive method of controlling outdialed calls from an ACD. "The number of outdial calls initiated by the call distributor 12 is coordinated with respect to the number of inbound call received over a preselected time period to reduce the average call waiting time in queue due to excessive distribution of outdialed calls to the agent telephonic units 20." (Vilsoet et al., col. 5, lines 15-20). In order to coordinate the number of outdial calls, a "predictive outdial algorithm running at the tandem computer 34 determines the pacing of outdial calls based on call switching and connection statistical information transmitted from the ACD 12" (Vilsoet et al., col. 6, lines 53-56). "The types of statistical information sent includes the average waiting time between calls, the amount of time in queue for calls, the average call set up time, the number of calls dialed before connection to an agent unit, the number of agent units signed into the system, the total number of agents available

to receive calls, the average call holding time and the amount of agent servicing time for particular calls" (Vilsoet et al., col. 8, lines 41-48). FIG. 2 of Vilsoet et al. shows method steps of calculating dial requests based upon the statistical information and reduced by the percentage of inbound calls.

As such, Vilsoet et al. does not have a neural network. Since Vilsoet et al. does not have a neural network, there cannot be any training of the neural network for servicing a plurality of call processing load conditions or distribution of resources based upon call processing load condition and the training of the neural network.

Similarly, Bigus et al. is also directed to a predictive dialing system. In this case, the Bigus et al. patent is based upon use of a neural network. To train the Bigus et al. neural network, to do predictive dialing, "the user specifies 16 input units (one each for month, day, year, day of week, hour, minute, second, pending calls, available operators, average connect delay, average idle time, nuisance call rate, average completion rate, average conversation length, idle time delta and nuisance call delta)" (Bigus et al., col. 9, lines 49-54). "When the neural network was trained, it determined a relationship between input data contained in call records with a call action (make or don't make the call). Based on this relationship, the neural network looks at the input data in the current call record and, in the preferred embodiment, passes a numeric value between 0 and 1 to predictive dialing

application program 41 via line 44 (FIG. 3B). The closer this numeric value is to 1, the more confident the neural network is that a call should be made." (Bigus et al., col. 13, lines 15-22).

Since Bigus et al. is directed to predictive outdialing, there is no training of a neural network with a set of resource relationships that is within the meaning provided by the description of the invention. Since there is no training, there is also no distribution of resources with that same meaning.

Donnelly is directed to a system that distributes incoming calls to a plurality of resources based upon a so-called "pleasure value". The pleasure values are set according to a predetermined criteria. "Two of the criteria that are considered are the time that a call has been waiting on line L_i and the time that the resource R and outgoing line I_o has been idle" (Donnelly, col. 5, lines 46-50). Further, "The pleasure values . . . are also a function of the classifications of the incoming calls and the resources" (Donnelly, col. 6, lines 3-5).

Under one embodiment of Donnelly, a neural network is used to distribute calls. "The network has an input layer 41 which in this example includes 1002000 neurons 42 that each receive data from the line timers 12, the resource timers 14 and other inputs which receive priority data dependent on the call classes and resource class" (Donnelly, col. 13, lines 46-50). "The output layer includes a configuration 45 for selecting the highest pleasure values for propagation as the winning recommendation for the cross-

connection program" (Donnelly, col. 13, lines 51-56).

Since the resources distributed by Donnelly are calls rather than resources of the automatic call distributor, Donnelly also fails to provide any teaching with regard to the training of a neural network with a set of desired resource relationships or of distributing resources of the automatic call distributor based upon call processor loading and the training of the neural network.

Corduroy et al. is directed to a system for reassigning agents from a first group to a second group. Nowhere within Corduroy is there any teaching of neural networks, training of a neural network or distributing resources of the automatic call distributor based upon call processor loading and the training of the neural network.

In the Office Action of 6/30/03, page 2, the Examiner asserts that "Vilsoet et al. discloses a method . . . comprising the steps of: learning a set of desired resource relationships for servicing a plurality of call processing conditions in the automatic call distributor (column 4, lines 53 to 58)". However, the referenced portion of Vilsoet et al. simply refers to a predictive outdial algorithm, not a neural network.

Neural networks are trained, not programmed (Response of 1/19/01, page 2). Since Neural networks can be trained, they have the ability to adapt to a changing environment by trial and error.

In contrast, the predictive outdialing algorithm of Vilsoet et al. is a computer program whose functionality can only be

changed by reprogramming (Response of 1/19/01, page 3). In addition, Newton's Telecom Dictionary defines "algorithm" as "A prescribed finite set of well defined rules or processes for the solution of a problem in a finite number of steps" (Response of 4/9/03). Since the Vilsoet et al. predictive outdial algorithm is a static structure, it does not have the ability to adapt by trial and error or to learn from a changing environment. Since the Vilsoet et al. predictive outdial algorithm cannot learn, Vilsoet et al. does not meet this claim element.

The Examiner asserts (Office Action of 6/30/03, page 2) that "Vilsoet et al. discloses . . . distributing resources of the automatic call distributor based upon call processor loading and the learned set of resource relationships (column 4, lines 32 to 52)". However, the referenced section of Vilsoet et al. merely refers to the pacing of outdialed calls. Since the distributed resources of the claimed invention are not the same as the Vilsoet et al. outdialed calls, Vilsoet et al. fails to teach or suggest this claim element.

The Examiner asserts (Office Action of 6/30/03, pages 2-3) that "neural networks are well known in the art . . . Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to have the system and method taught by Vilsoet et al. implemented in a neural network". However, even if the method of Vilsoet et al. were implemented as a neural network, Vilsoet et al. would still not have the functionality of

the claimed invention. As demonstrated above, Vilsoet et al. is limited to predictive outdialing whereas the claimed invention is limited to distribution of resources of the automatic call distributor.

B. A Prima facie Case of Obviousness Has Not Been Established

The Federal Circuit has continually held that the Examiner has the burden under 35 U.S.C. §103 of establishing a prima facie case of obviousness. In re Glaug, 283 F.3d, 1335, 62 U.S.P.Q.2d, 1151 (Fed. Cir. 2002); In re Oetiker, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992); In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). This burden may be satisfied only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to the claimed invention. For example, as the Federal Circuit has held recently, as well as on numerous other occasions: "[t]here must be some reason, suggestion or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination." In re Oetiker, supra, 24 USPQ2d at 1446.

Moreover, the mere fact that the prior art references could be modified in the manner proposed by the Examiner would not have made the modification obvious unless there is some motivation or suggestion in the prior art to do so. In re Kotzab, 217 F.3d

1365, 55 USPQ2d 1313 (Fed. Cir. 2000); In re Gordon, 773 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984), also see In re Fritch, 972 F.2d 1260, 23 USPQ2d 1781, 1783 (Fed. Cir. 1992) (The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification).

When making an assessment of the obviousness of the claimed invention, the prior art, viewed as a whole, must "suggest the desirability, and thus the obviousness, of making the combination." In re Beattie, 974 F.2d 1309, 24 USPQ2d 1040 (Fed. Cir. 1992), quoting Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co., 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir. 1984). Similarly, the Examiner, under §103, must consider the claimed subject matter "as a whole". In assessing the claimed subject matter "as a whole", the results and advantages of the claimed invention must be considered. Diversitech Corp. v. Century Steps, Inc., 850 F.2d 675, 7 USPQ2d 1315 (Fed. Cir. 1988); In re Chupp, 816 F.2d 643, 2 USPQ2d 143 (Fed. Cir. 1987).

It is incumbent upon the Examiner to demonstrate that the proposed combination of reference teachings is proper. Where no express teaching or suggestion is apparent from the references, the Examiner must establish, with evidence or reasoning, why one skilled in the art would have been led by the relevant teachings of the applied references to make the proposed combination. In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984); ACS Hospital

System, Inc. v. Montefiorde Hospital, 732 F.2d 1572, 221 USPQ 929 (Fed. Cir. 1984). When making an obviousness rejection, "[i]t is impermissible, however, simply to engage in hindsight reconstruction of the claimed invention, using the applicant's structure as a template". In re Gorman, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991).

Applicant submits, upon a close examination of the record, that the Examiner has failed to meet the burden of establishing a prima facie case of obviousness. In general, the Examiner has failed to establish, with evidence or reasoning, why one skilled in the art would have been led by the relevant teachings of the applied references to make the proposed combination. Further, the Examiner has apparently engaged in hindsight reconstruction as demonstrated by his assertion that "if a system 'learns' a set of desired relationships, then of course, training occurs as well . . . In order for a system to 'learn', that system must monitor, analyze, absorb, and ultimately learn how to properly react to those certain aspects of the system that are to be 'learned' . . . This is in effect learning" (Office Action of 6/30/03, page 3). The problem with the Examiner's logic, however, is that the statement presumes that Vilsoet et al. learns when, in fact, there is no suggestion of learning or that it is the same type of learning associated with neural networks.

In contrast, Bigus et al. and Donnelly may learn and may be trained, but it is the wrong type of training. The training in

Bigus et al. is directed to predictive dialing, which is different than a system that distributes resources of the automatic call distributor. Similarly, Donnelly is directed to methods of distributing calls instead of distributing resources. Corduroy does not even presume to learn or be trained. Since Vilsoet et al., and Corduroy et al. do not learn and are not trained and since Bigus et al. and Donnelly involve the wrong type of training, it is believed that there is no teaching or suggestion of the claimed invention in the various combination cited by the Examiner.

For the foregoing reasons, reversal of the rejections of claims 25-48, as now presented, is believed to be in order and such action is earnestly solicited.

IX. CONCLUSION

For the foregoing reasons, allowance of claims 1-24, as now presented, is believed to be in order. It is respectfully requested that this Board reverse the decision of the Examiner in all respects.

Respectfully submitted,

WELSH & KATZ, LTD.

By

Jon P. Christensen
Registration No. 34,137

October 21, 2003
WELSH & KATZ, LTD.
120 South Riverside Plaza
22nd Floor
Chicago, Illinois 60606
(312) 655-1500

APPENDIX OF CLAIMS

1. A method of processing calls in an automatic call distributor, such method comprising the steps of:

training a neural network with a set of desired resource relationships for servicing a plurality of call processing load conditions in the automatic call distributor; and

distributing resources of the automatic call distributor based upon call processor loading and the training of the neural network.

2. The method of processing calls as in claim 1 wherein the step of distributing resources further comprises adjusting a ratio of inbound calls to outbound calls based upon the operating level of the automatic call distributor.

3. The method of processing calls as in claim 1 wherein the step of distributing resources further comprises reassigning an agent of a first group to a second group.

4. The method of processing calls as in claim 1 wherein the step of learning the set of desired resource relationships further comprises determining a number of call that have been answered and are in a queue waiting to be assigned to an agent.

5. The method of processing calls as in claim 1 wherein the step of learning the set of desired resource relationships further comprises determining a number of available agents.

6. The method of processing calls as in claim 1 wherein the step of learning the set of desired resource relationships further comprises determining an average call waiting time of a call in a call queue.

7. The method of processing calls as in claim 1 wherein the step of learning the set of desired resource relationships further comprises determining an average call waiting time of a call for each group of a plurality of agent groups of the automatic call distributor.

8. The method of processing calls as in claim 1 wherein the step of learning the set of desired resource relationships further comprises determining a number of calls in a call queue for each group of a plurality of agent groups of the automatic call distributor.

9. The method of processing calls as in claim 1 wherein the step of learning the set of desired resource relationships further comprises determining an average waiting time between call arrival at the automatic call distributor and call acceptance.

10. Apparatus for processing calls in an automatic call distributor, such apparatus comprising:

means for training a neural network with a set of desired resource relationships for servicing a plurality of call processing load conditions in the automatic call distributor; and

means for distributing resources of the automatic call distributor based upon call processor loading and the training of the neural network.

11. The apparatus for processing calls as in claim 10 wherein the means for distributing resources further comprises means for adjusting a ratio of inbound calls to outbound calls based upon the loading level of the automatic call distributor.

12. The apparatus for processing calls as in claim 10 wherein the means for distributing the resources further comprises means for reassigning an agent of a first group to a second group.

13. The apparatus for processing calls as in claim 10 wherein the means for learning the set of desired resource relationships further comprises means for determining a number of calls that have been answered and are in a queue waiting to be assigned to an agent.

14. The apparatus for processing calls as in claim 10 wherein the means for learning the set of desired resource relationships further comprises means for determining a number of available agents.

15. The apparatus for processing calls as in claim 10 wherein the means for learning the set of desired resource relationships further comprises means for determining an average call waiting time of a call in a call queue.

16. The apparatus for processing calls as in claim 10 wherein the means for learning the set of desired resource relationships further comprises means for determining an average call waiting time of a call for each group of a

plurality of agent groups of the automatic call distributor.

17. The apparatus for processing calls as in claim 10 wherein the means for learning the set of desired resource relationships further comprises means for determining a number of calls in a call queue for each group of a plurality of agent groups of the automatic call distributor.

18. The apparatus for processing calls as in claim 10 wherein the means for learning the set of desired resource relationships further comprises means for determining an average waiting time between call arrival at the automatic call distributor and call acceptance.

19. Apparatus for processing calls in an automatic call distributor, such apparatus comprising:

a neural network trained with a set of desired resource relationships for servicing a plurality of call processing load conditions in the automatic call distributor; and

a call processor adapted to distribute resources based upon call processor loading and the training of the neural network.

20. The apparatus for processing calls as in claim 19 wherein the call processor adapted to distribute resources further comprises a proportioning processor adapted to adjust a ratio of inbound calls to outbound calls based upon the loading level of the automatic call distributor.

21. The apparatus for processing calls as in claim 19 wherein the call processor adapted to distribute resources further comprises a group processor adapted to reassign an agent of a first group to a second group.

22. The apparatus for processing calls as in claim 19 wherein the neural processor further comprises a call counter adapted to determine a number of calls that have been answered and are in a queue waiting to be assigned to an agent.

23. The apparatus for processing calls as in claim 19 wherein the neural processor further comprises an agent activity processor adapted to determine a number of available agents.

24. The apparatus for processing calls as in claim 19 wherein the neural processor further comprises a call timer adapted to determine an average call waiting time of a call in a call queue.